CLAIMS

WHAT IS CLAIMED IS:

1. A polynucleotide encoding an apyrase and comprising a nucleotide sequence having at least about 80% sequence identity to a polynucleotide selected from the group consisting of:

(a) a polynucleotide having the nucleotide sequence of SEQ ID NO. 2;

(b) a polynucleotide having the protein encoding nucleotide sequence of the polynucleotide sequence of (a) or (b).

2. An isolated polynucleotide encoding a polypeptide with NDPase activity, comprising a polynucleotide selected from the group consisting of:

(a) polynucleotides that encode the amino acid sequence of SEQ ID NO. 3.

3. An isolated polynucleotide encoding a polypeptide with NDPase activity that hybridizes under stringent conditions to the complement of a polynucleotide of SEQ ID NO. 2.

4. The polynucleotide of any one of claims 1 - 3 which is a DNA.

5. The DNA of claim 4 which is a wholly or partially chemically synthesized DNA molecule.

6. An anti-sense polynucleotide which specifically hybridizes with the complement of the polynucleotide of claim 3.

7. The polynucleotide of claim 1 which has the nucleotide sequence of SEQ ID NO. 2.

8. An isolated polynucleotide which comprises a complement of the polynucleotide of claim 1.

9. An expression vector comprising the DNA of claim 4.

10. A host cell comprising the DNA of claim 4.

11. A host cell genetically engineered to contain the DNA of claim 4.

12. An isolated polypeptide with NDPase activity comprising:

(a) the CD39-like protein coding sequence of SEQ ID NO. 3; or

(b) an amino acid sequence having at least about 80% sequence identity to SEQ ID NO. 3.

13. The polypeptide of claim 12 wherein the polypeptide comprises at least one amino acid substitution selected from the group consisting of: D168→T, S170→Q and L175→F.

14. The polypeptide of claim 13 comprising a polypeptide having the amino acid sequence set forth in SEQ ID NO. 7.

15. A method for producing a CD39-like polypeptide comprising the steps of:

(a) growing a culture of cells according to claim 10 under conditions permitting expression of a CD39-like polypeptide; and

(b) isolating the CD39-like polypeptide from the host cell or its growth medium.

16. A composition comprising the polypeptide of claim 12 or 13 and a pharmaceutically acceptable carrier.

17. An antibody specifically immunoreactive with a polypeptide encoded by the polynucleotide according to claim 1.

18. The antibody according to claim 17 which is a monoclonal antibody.

19. A hybridoma which secretes the antibody according to claim 18.

20. A method for detecting a polynucleotide of claim 1 or 3 in a sample comprising the steps of:

(a) contacting the sample with a compound that binds to and forms a complex with the polynucleotide for a period sufficient to detect the complex; and

(b) detecting the complex so that if a complex is detected, a polynucleotide of claim 1 or 3 is detected.

21. A method for detecting a polynucleotide of claim 1 or 3 in a sample comprising the steps of:

(a) contacting the sample under stringent hybridization conditions with nucleic acid primers that anneal to a polynucleotide of claim 1 or 3 under such conditions; and

(b) amplifying the polynucleotides of claim 1 or 3 so that if a polynucleotide is amplified, a polynucleotide of claim 1 or 3 is detected.

22. The method of claim 21 wherein the polynucleotide is an RNA molecule that encodes a polypeptide of claim 12, and the method further comprises reverse transcribing an annealed RNA molecule into a cDNA polynucleotide.

23. A method for detecting a polypeptide of claim 12 in a sample comprising:

(a) contacting the sample with a compound that binds to and forms a complex with the polypeptide for a period sufficient to detect the complex; and

(b) detecting the complex so that if a complex is detected, a polypeptide of claim 12 is detected.

24. A method for identifying a compound that binds to a polypeptide of claim 12 comprising:

(a) contacting a compound with a polypeptide of claim 12 for a time sufficient to form a polypeptide/compound complex; and

(b) detecting the complex so that if a polypeptide/compound complex is detected, a compound that binds to a polypeptide of claim 12 is detected.

25. A method for identifying a compound that binds to a polypeptide of claim 12 comprising:

(a) contacting a compound with a polypeptide of claim 12, in a cell, for a time sufficient to form a polypeptide/compound complex, wherein the complex drives expression of a reporter gene sequence in the cell, and

(b) detecting the complex by detecting reporter gene sequence expression so that if a polypeptide/compound complex is detected, a compound that binds to a polypeptide of claim 12 is identified.

26. A method of identifying a modulator compound of a CD39-like protein with apyrase activity comprising the steps of:

(a) contacting the CD39-like polypeptide encoded by the polynucleotide of claim 1 or 3 which a substrate in the presence and absence of a test compound;

(b) comparing apyrase activity of the CD39-like polypeptide in the presence and absence of the test compound; and

(c) identifying the test compound as a modulator compound when biological activity of the CD39-like polypeptide is increased or decreased in the presence of the test compound.

27. A method of identifying a modulator compound of a CD39-like protein with NDPase activity comprising the steps of:

(a) contacting the CD39-like polypeptide encoded by the polynucleotide of claim 1 or 3 which a substrate in the presence and absence of a test compound;

(b) comparing NDPase activity of the CD39-like polypeptide in the presence and absence of the test compound; and

(c) identifying the test compound as a modulator compound when biological activity of the CD39-like polypeptide is increased or decreased in the presence of the test compound.

28. A chimeric polypeptide comprising one or more domains of a CD39-like polypeptide fused to one or more domains of heterologouos peptide or polypeptide, e.g., an immunoglobulin constant region.

29. A method of treatment comprising administering to a mammalian subject in need thereof a therapeutic amount of a composition comprising a polypeptide of claim 12 and a pharmaceutically acceptable carrier.

30. A method of treatment comprising administering to a mammalian subject in need thereof a therapeutic amount of a composition comprising an antibody that specifically binds to a polypeptide of claim 12 and a pharmaceutically acceptable carrier.

31. A method of inhibiting platelet function comprising administering the polypeptide of claim 12 to a medium comprising platelets.

32. A method of treating thrombotic diseases comprising administering a therapeutic amount of the polypeptide of claim 12 to a mammalian subject in need thereof.